

315/267
3/10/2000REMARKS

In a first Office Action dated May 17, 2004 (paper no. 2), the Examiner objected to the Abstract and the specification due to informalities. The Examiner rejected claims 1-10 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. In particular, the Examiner contended the preambles of claims 1 and 5 are unclear as to whether these are method claims or apparatus claims. The Examiner rejected claims 1, 3-5, 7, 10, 11, 13-15, 17, and 23 under 35 U.S.C. §103(a) as being unpatentable over Hogberg et al. (U.S. patent no. 6,697,619, hereinafter referred to as "Hogberg") in view of Liang et al. (U.S. patent no. 6,314,147, hereinafter referred to as "Liang"). The Examiner rejected claims 2, 6, 12, and 16 under 35 U.S.C. §103(a) as being unpatentable over Hogberg in view of Liang and further in view of Dent (U.S. patent no. 6,404,821). The Examiner objected to claims 8, 9, and 18-22 as being dependent upon a rejected base claim but as being allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. The rejections are traversed and reconsideration is hereby respectfully requested.

The applicant has amended the preambles of each of claims 1 and 5 to clarify that these are method claims. Accordingly, the applicant respectfully requests that the Examiner withdraw the 35 U.S.C. §112, second paragraph, rejection of claims 1-10. The applicant has also amended the Abstract and specification in order to comply with the objections of the Examiner.

The applicant has further amended each of claims 1, 5, 11, and 15 to clarify that that the claims concern optimization of multiple weighting coefficients to produce multiple optimized weighting coefficients for use by a transmitting communication device in transmissions to multiple subscriber units.

The Examiner rejected claims 1, 3-5, 7, 10, 11, 13-15, 17, and 23 under 35 U.S.C. §103(a) as being unpatentable over Hogberg in view of Liang. Specifically, with respect to claims 1, 5, 11, and 15, the Examiner contended that Hogberg teaches a beamforming acquisition system comprising multiple subscriber units (SUs) and an antenna array

comprising multiple antenna elements, wherein each optimized antenna coefficient of multiple optimized antenna coefficients is associated with an element of the multiple elements and is further associated with an SU of the multiple SUs (FIGs. 2-4; col. 1, lines 61-66; col. 2, lines 8-12; col. 3, lines 41-44; col. 5, lines 1-2 and 11-12; col. 6, lines 5-32). The Examiner acknowledged that Hogberg does not teach jointly optimizing multiple weighting coefficients. However, the Examiner contended that this is taught by Liang (FIG. 5, col. 1, lines 21-32; col. 3, lines 51-64; col. 4, lines 11-17; col. 11, lines 25-41).

Neither Hogberg nor Liang, individually or in combination, teaches the limitations of claims 1, 5, 11, and 15. Hogberg teaches a satellite communications system. A beamforming subsystem of a satellite forms a beam that is scanned over an area of a footprint of the satellite in order to detect active SUs subscribed to the system's services. When the satellite locates an active SU, the satellite then directs a traffic beam to that SU. Hogberg merely mentions determining beam coefficients based on SU location and assigned time slots and teaches nothing about beam optimization for an SU, let alone optimizing coefficients for multiple SUs.

Liang merely teaches a receiver that optimizes filter weight coefficients of a filter in the receiver in order to suppress interference in a received signal. Liang does not teach a transmitting communication device, as in claims 11 and 15, or a method for beamforming in a transmitting communication device, as in claims 1 and 5, and therefore cannot be considered to teach optimizing weighting coefficients to minimize interference among signals transmitted to each of multiple SUs, let alone the features of claims 1, 5, 11, and 15 of joint, or approximated joint, optimization of the weighting coefficients associated with the multiple SUs. Therefore neither Hogberg nor Liang, individually or in combination, teach the features of claims 1, 5, 11, and 15 of antenna beamforming in a transmitting communication device that includes joint optimization, or approximations of a joint optimization expression that permits independent optimization, of multiple weighting coefficients to produce multiple optimized weighting coefficients for use in transmissions to multiple subscriber units, wherein each optimized weighting coefficient of the multiple optimized weighting coefficients is associated with an element of multiple

antenna elements and is further associated with an SU of the multiple SUs. Accordingly, the applicant respectfully requests that claims 1, 5, 11, and 15 may now be passed to allowance.

Since claims 2-4 depend upon allowable claim 1, claims 6-10 depend upon allowable claim 5, claims 12-14 depend upon allowable claim 11, and claims 16-23 depend upon allowable claim 15, the applicants respectfully request that claims 2-4, 6-10, 12-14, and 16-23 may now be passed to allowance.

The applicant further points out that Hogberg and Liang each teaches TDMA communication systems. Rake receivers are used in CDMA communication systems and are not used in, nor even logically applicable to, TDMA communication systems. Therefore, neither Hogberg and Liang, individually or in combination, can be construed to teach the features of claims 7, 10, 17-20, and 23 that involve a Rake receiver.

As the applicant has overcome all substantive rejections and objections given by the Examiner and has complied with all requests properly presented by the Examiner, the applicant contends that this Amendment, with the above discussion, overcomes the Examiner's objections to and rejections of the pending claims. Therefore, the applicant respectfully solicits allowance of the application. If the Examiner is of the opinion that any issues regarding the status of the claims remain after this response, the Examiner is invited to contact the undersigned representative to expedite resolution of the matter.

Respectfully submitted,
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